Historical studies and woodland conservation

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Introduction

The present time is critical for woodland conservation in Britain. Deciduous woods are being destroyed for arable land or clear-felled and replanted with conifers at an alarming rate.

Table 1 (due to C.E.Ranson) shows that in Mid-Suffolk (area defined in Fig. 1) less than half of the deciduous woodland existing in 1837 remains as such. Much of the surviving woodland is threatened with destruction in the next few years.

At the same time, despite the mass of ecological literature on certain woodland types, especially those represented in existing nature reserves, there is a regrettable lack of systematic information, even at the descriptive level, about lowland woods as a whole. Suffolk, for instance, was almost unrecorded until the Nature Conservancy's woodland survey began in 1966. Ecological classification must therefore be incomplete and attempts at conservation haphazard.

Table 1. Woodland in Mid-Suffolk expressed as a percentage of the total land area

Deciduous woodland in 1837	4·4
Deciduous woodland in 1837 now destroyed	2·0
Deciduous woodland in 1837 now conifers	0·7
Surviving deciduous woodland	1·8
Woods established since 1837	0·5

Little attention has been paid to the origin and development of individual woods, largely because vegetational historians have concentrated on stratigraphical methods which have little to say on this subject. Writers from

Tansley (1939) onwards have assumed that present-day British woodlands are in some way related to the floristically comparable forests of the later postglacial, but there is not much definite evidence on the nature of this relationship.

Historical evidence enables the ecologist to see the current destruction of deciduous woodland in its proper perspective. Public authorities often allege, for instance, that the loss of existing woods is (or could be) offset by new 'amenity' plantings. In practice, secondary woodlands in East Anglia may remain floristically depauperate for centuries (cf. Pigott (1969) for Derbyshire). Historical information enables us to look beyond the neglect or 'devastation' of much English woodland in the last few decades to the often more conservative management of past centuries. Without such information it is impossible adequately to assess the importance of individual woods and woodland types, or to draw up rational management schemes without awaiting the results of long-term experiments.

Although historical studies have a place in the conservation of single species, this paper is concerned with the maintenance of as great a range as possible of the ecosystems thought to be characteristic of an area. Logically this should proceed in three stages:

Stage 1. General survey of all the woodlands within a geographical area.

Stage 2. Selection of sites meriting particular attention, e.g. by forming reserves.

Stage 3. Detailed research on selected sites and the drawing up of management plans.

This sequence, of course, is often impracticable. Stage 2 decisions, for instance, are often precipitated by a particular wood coming on the market or being threatened with destruction; the decision to buy the wood or to oppose the destruction may have to be taken at short notice on inadequate information.

East Anglian woodlands

Apart from large modern plantations, the woods of East Anglia (Fig. 1) are scattered blocks mainly of under 100 ha. The 'heavy' *Quercus robur-Fraxinus-Acer campestre-Corylus* woodland type on chalky boulder clay is described by Adamson (1912), Valentine (1948), Abeywickrama (1949), Martin (1968), and others. On sandy more acid Pleistocene deposits there is an undescribed* 'light' type with *Quercus robur*, *Tilia cordata*, and *Betula pubescens*. Each type occurs in several variants, and there are transitions to the *Alnus-Salix* carr of fen valleys and to the Essex *Carpinus* woods (Christy 1924), both of which are outside the scope of this paper. Woods often show much internal variation.

* Adamson's 'loam area' is a variant of this type.

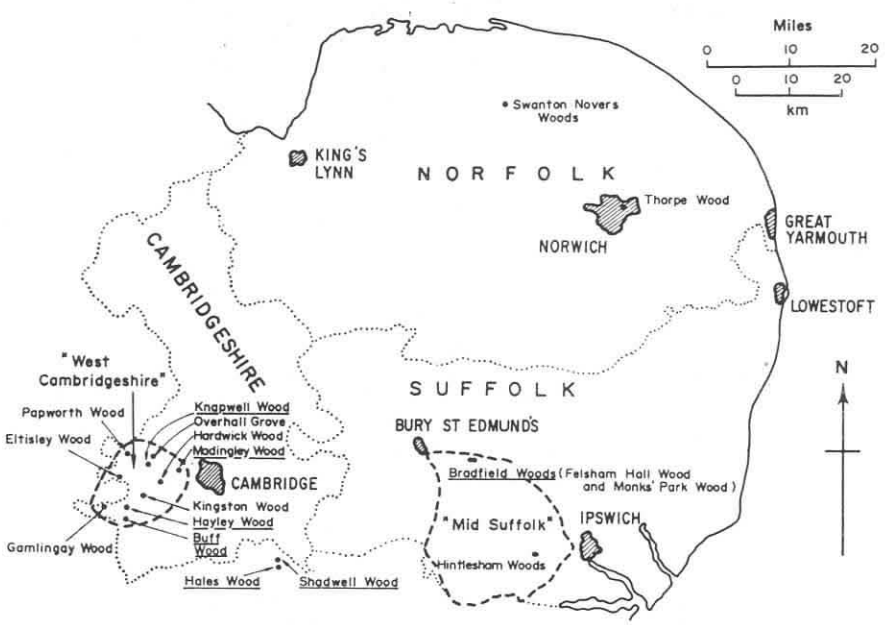

Figure 1. East Anglia, showing boulder-clay wood reserves (underlined) and woods mentioned in the text.

Many East Anglian woods appear to be historically continuous with the prehistoric forest on sites which have never been cleared.* Others are wholly or partly secondary woodland originating in various ways and at various times on former open land. The original forest was fragmented in Anglo-Saxon times and surviving woods were maintained for intensive timber production under a coppice-with-standards system which went on for at least 700 years (Rackham 1967). Coppicing was abandoned in most woods between 1890 and 1930, but a few are still coppiced and nearly all the older woods show some trace of the practice.

In an area in which human intervention has been a relatively stable ecological factor for many centuries, conservation management and experimentation should start from a knowledge of what 'traditional' management consisted of, and what variation there was from place to place and from time to time.

Types of historical information

This is a brief outline of the methods of investigating woodland history, with the suitability of each method for particular stages of an investigation

* Another East Anglian ecosystem which may in some cases be derived from prehistoric forest is parkland (Peterken 1969).

based on the time and specialized knowledge which it demands. Further information will be published in Rackham (in press).

As far as possible, a group of comparable woods should be studied rather than one or two sites. Much historical evidence is sporadic in its occurrence and no one site is likely to provide complete information. All historical material, except certain types of documents and the annual rings of living trees, involves more or less circumstantial interpretation which can be carried out with confidence only on the basis of a comparative study within a geographical area. It is hazardous to apply such interpretations outside the area where they have been tested, except where independent types of evidence corroborate one another.

Pollen analysis

Iversen (1964) traces the history of Draved Forest in Jutland up to the present day from pollen deposits within the wood. This is seldom possible in Britain; suitable deposits inside woods appear to be rare, and because the forest cover was fragmented by agriculture many centuries ago late pollen diagrams contain information from many vegetation types within an ill-defined area.

Available diagrams should be consulted at Stage 1 to provide general information on local vegetation history and on what trees, particularly uncommon species, are likely to be native.

Documents

Documentary methods for woods are similar to those for other features of the landscape (Hoskins (1959, 1967) gives a general account). Only the most fruitful of the great variety of sources for East Anglia are mentioned.* Documentary evidence is generally precise as to date but (apart from maps) often imprecise as to site.

Maps

The first edition Ordnance Survey, published (except for Scotland and northern England) in the first half of the nineteenth century, should be consulted at Stage 1, especially as reprints are now easily accessible. Map sources for Stage 2 include the later O.S. editions (Harley & Phillips 1964), and the large-scale enclosure, tithe, and estate maps of the sixteenth to nineteenth centuries which exist for most parishes and are usually kept in the county

* Woods belonging to the Crown have their own documentation, which is outside the scope of this paper. See Albion (1926), Hart (1966), and Tubbs (1968).

record office. The earliest known map showing East Anglian woods is for Hintlesham in 1595 (Ryan & Redstone 1931).*

National land surveys

Three relevant national surveys are sufficiently easily accessible for use at Stage 2. The entries of Domesday Book (1086) are conveniently summarized by Darby (1950, and in the regional volumes such as Darby (1952)), but Domesday woodland statistics are notoriously difficult and unreliable to interpret. The Hundred Rolls of 1279 (Rotuli Hundredorum 1818) are much more detailed and explicit and probably more reliable, but exist for only a few counties.† The Valor Ecclesiasticus (printed 1810–34) mentions the larger of the many woods owned by the church in 1535. These surveys give some information on woodland areas but seldom anything on management.

Local surveys

Estate surveys or 'extents' mentioning woodland occur in Anglo-Saxon wills, medieval monastic cartularies and inquisitions *post mortem*, leases and conveyances, and modern sale handbills, etc. Some of them are quite detailed and contain management particulars. Many are kept in county record offices and should be consulted at Stage 2. Finding and interpreting the earlier ones is a somewhat specialized study.

Accounts

The annual accounts of estates often contain particulars of timber and coppice sold, bought, or consumed on the estate, from which woodland management can sometimes be reconstructed in detail (Fig. 2). East Anglian examples so far known are mainly medieval. Such studies are suitable for Stage 3.

Court proceedings

Lawsuits about woods may result in a detailed survey being made of the wood and management details being recorded. The most fruitful source is the proceedings of the Court of Exchequer in the sixteenth and seventeenth centuries. For instance, the information in Fig. 2 is fortunately supplemented by a case concerning Hardwick Wood in 1589 (Rackham 1967). This is a source for Stage 3. The minor criminal proceedings of manor courts

* Thorpe Wood appears in the panoramic view of Norwich by Hoefnagel, *c.* 1580.

† In West Cambridgeshire, almost all the woods in the Hundred Rolls can be related in position and area to present-day woodland (Rackham 1968).

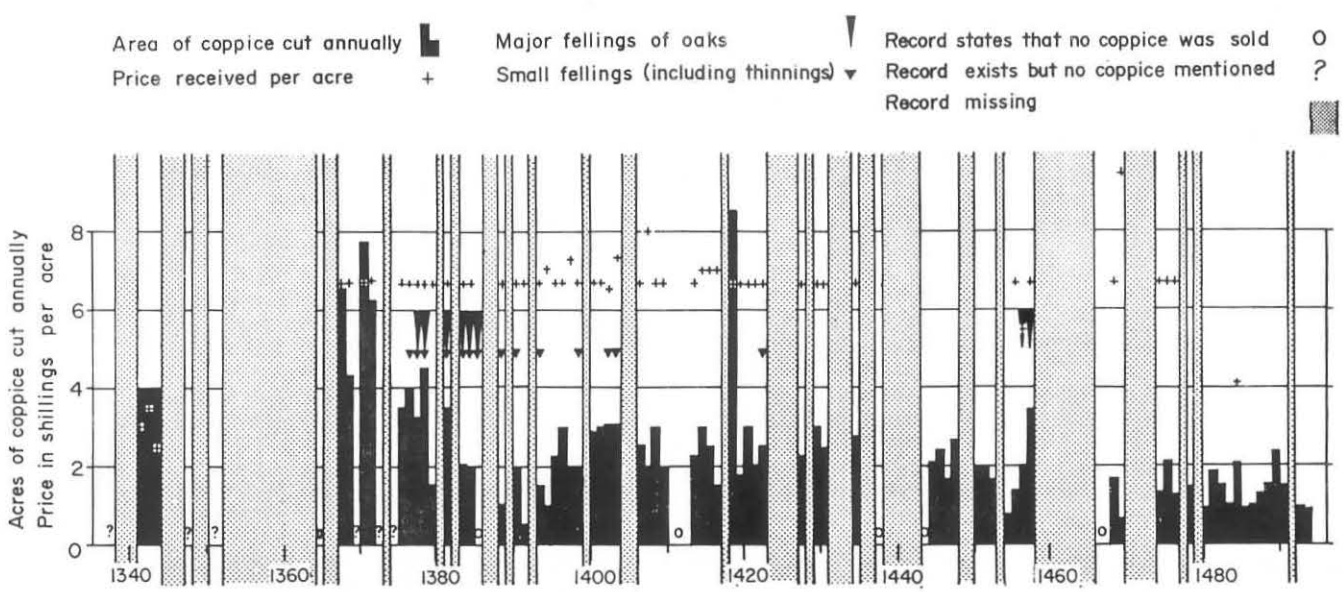

Figure 2. Quantities of coppice sold yearly from Hardwick Wood during the latter Middle Ages, together with the price received per acre and the years in which oaks were felled. The information is derived from the annual accounts of the manor, of which the wood formed only a small part, so that the missing records do not necessarily imply that no coppice was sold in those years. The existence of a record in which no coppice is mentioned probably does imply that no income was received from this source. The figures probably imply an average coppice rotation of about 4 years in the fourteenth century, increasing to $6\frac{1}{2}$ years in the latter fifteenth century. See Rackham (1967) for further discussion.

sometimes contain isolated details of woods, but although picturesque these are seldom scientifically worth the labour of searching for them.

Sale advertisements

Sales of woods and timber are the main written source for woodland management in the otherwise poorly documented nineteenth century. Their study belongs to Stage 3, as it involves tedious searching of newspapers.

These sources combined provide incomplete information on woodland continuity, and more or less detail on felling, coppicing, grazing, and other management practices. Management information in East Anglia tends to be more complete for the Middle Ages than for later periods. Floristic information is usually limited to the names of the commoner trees.*

Archaeology

Woods, at least on the heavier soils, preserve earthworks within them. A wood is likely to contain all the ditches and other surface features that have been on the site since the wood was established. Some information about these should be collected at Stage 1 and a map should be made for Stage 2. They are precise as to place, but can seldom be accurately dated, and thus complement documentary evidence.

Wood outlines on heavy soils are very stable. Ancient woods nearly always have a slightly sinuous outline (Fig. 6) by which they can be tentatively recognized at Stage 1 on the $2\frac{1}{2}$ in O.S. map. Perfectly straight edges generally result from comparatively modern addition or subtraction.

The earthwork most characteristic of woods is a boundary bank and ditch with the bank nearly always on the *wood* side. Wood-banks are frequently mentioned in medieval documents; they continued to be made into the nineteenth century but later ones are small. Internal coppice-banks of the kind found in the New Forest (Tubbs 1968) are rare in East Anglia, probably because grazing was seldom important in woods.

Numerous non-woodland types of earthworks, such as the ridge-and-furrow of former ploughland and the moats of former farmsteads, occur in woods and prove that their sites were at one time not wooded. Figure 3 shows the complex earthworks of Buff Wood, with old secondary woodland outside the wood-bank of a much smaller original wood.

* Uncommon trees are occasionally recorded: the Gamlingay court rolls of 1464 record a fine imposed for damaging 'arbores vocate crabtres', which is the earliest direct evidence for *Malus sylvestris*. Early botanical accounts are exceptional: Ray (1660) records numerous plants for Madingley and Kingston woods, from which it is known that Kingston has changed little floristically but Madingley is now much poorer.

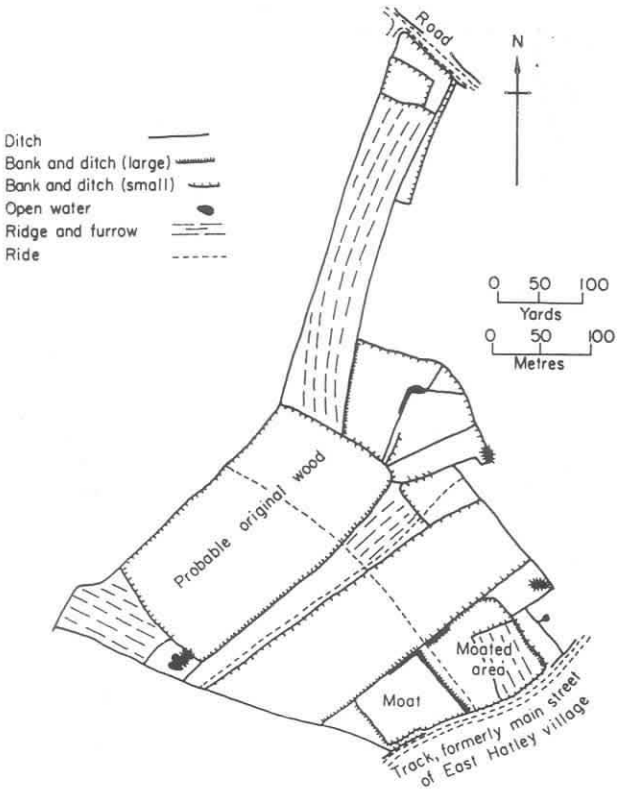

Figure 3. The earthworks of Buff Wood. Correlation with woodland structure and vegetation and with some documentary evidence suggests that a small original wood increased in size at the expense of what had been arable and pasture. This took place, perhaps in stages, between 1300 and 1600, and was perhaps connected with the decline of the medieval village of East Hatley, of which two moats are now inside the wood.

Vegetation

Annual rings of living trees

An obvious source for the age-structure of the present woodland and for growth rates in the immediate past. The annual rings of ash stools sometimes provide a record of coppice cycles over the past 200 years.

Woodland structure

Provides evidence of whether the site was coppiced and how long ago coppicing ceased. Neglected ancient 'heavy' woodland typically has a three-layered structure (Fig. 4): standards of oak with a few ash (the latter often

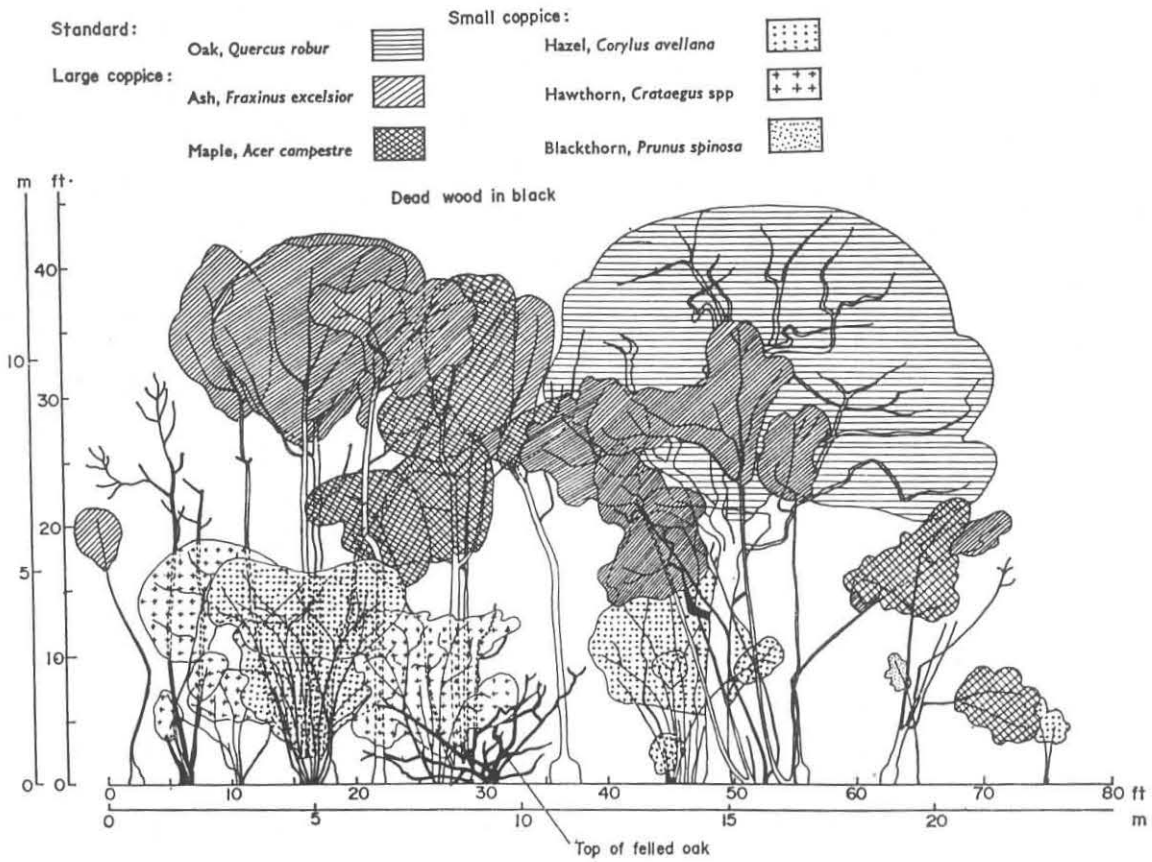

Figure 4. Measured profiles of all trees over 6 ft (2 m) high on a transect 25 m (80 ft) wide in Hayley Wood, last coppiced in 1897. Recorded with the help of P.J.Grubb, March 1968.

'promoted' coppice); large coppice of ash and maple arising from massive long-lived hollow stool bases; and small coppice of hazel and hawthorn with smaller underground stools. Woods with this structure are sometimes secondary but not less than 300 years old. 'Light' woodland has fewer characteristic features but giant stools of *Tilia* sometimes replace those of *Fraxinus*.

Plant species

Certain plants are associated with woods of particular historical types. For instance, within East Anglia, *Primula elatior* (Christy 1897), *Sorbus torminalis*, *Tilia cordata* (cf. Pigott (1969) for Derbyshire), *Campanula trachelium*, *Mercurialis perennis*, and *Platanthera chlorantha* are characteristic of ancient woodland; and *Hedera helix* (as ground cover), *Primula veris*, *Daphne laureola*, and *Anthriscus sylvestris* are characteristic of secondary woodland. Assemblages of these plants are more reliable than single species; thus *Primula elatior*, though rarely found away from ancient woods, occurs in several places within 600 m of the ancient Eltisley Wood (e.g. Kerr (1967), Valentine (1948), Abeywickrama (1949)), in several ancient hedges in East Cambridgeshire, and in a few fens (e.g. Galpin (1888), Woodell (1965)). Moreover, secondary woodland *adjoining* ancient woodland contains some characteristic species of the latter, and *vice versa*.

Building timbers

Timbers in medieval and sub-medieval buildings are often hewn from entire tree-trunks and provide evidence of the size and shape of the tree and its rate of growth. Wattle-and-daub material gives similar information about coppice. This is a difficult method, requiring a knowledge of vernacular architecture and means of establishing the provenance of the timber, but provides direct evidence of woodland management and thus deserves more detailed study.

Stage 1: Local woodland surveys

Existing methods in conservation surveys of woodland are rather unsatisfactory given the limitations of time and manpower. Visits often have to be hurried, incomplete, made by inexperienced persons and at unfavourable times of year. Even at the simplest floristic level, a reasonably complete assessment of a group of woods requires many visits to each site. Figure 5a shows the recording of vascular plants in Hayley Wood, a well-known site near Cambridge frequently visited by professional botanists for over a century, and Fig. 5b shows the progress of a more intensive study of the

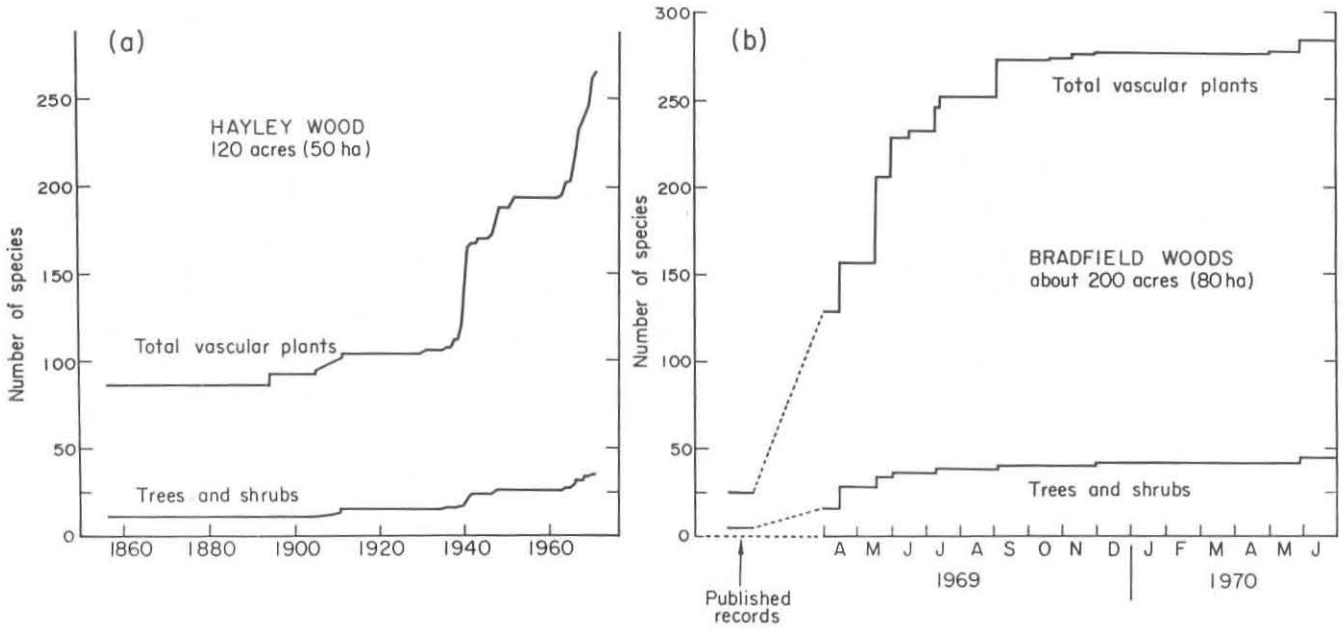

Figure 5 (*a*) History of the recording of vascular plants, and of trees and shrubs (excluding *Rubus*) in Hayley Wood. Note three distinct phases of recording activity. Compiled from many sources, chiefly Babington (1860), Babington's MS notes in Cambridge University Botany School, and the Cambridge Natural History Society's records.
(*b*) Similar diagram for the Bradfield Woods. Records up to April 1969 are due to Mrs A.Hart. Later records collected by the author with the help of Miss P.F.Cammell, Mr and Mrs F.L.Harris, Mrs Hart, and others.

Bradfield woods, an effectively virgin site for which few pre-1968 records were available. The Nature Conservancy's woodland record cards, with their emphasis on woody species, might be expected to suffer less from this disadvantage; this is not borne out either by Hayley or Bradfield, in both of which, despite the differences in recording procedure, the progress of recording trees and shrubs has been closely parallel to that for the total vascular flora. Two tree species were added to the Hayley Wood list in 1968–9, having been overlooked for decades, which is a warning against overreliance on presence-or-absence data.

Elementary historical material is an important part of the 'background' information necessary for the interpretation of such incomplete biological records. Apart from written evidence, surface features and other field data can be recorded at a single visit, by unskilled persons, and at otherwise unsuitable seasons.

Stage 2: Assessment and selection of sites

Several historical issues arise at this stage, especially where a wood is complex and it is possible to select only part of it for conservation management. It is necessary to know whether special features of importance are a transient result of succession or are likely to continue under suitable management. If a site is threatened with some undesirable change, it is important to know to what extent it is replaceable. Recent woodland is potentially replaceable whereas ancient woodland, particularly on sites which have never been ploughed, is not, although the distinction is more marked with some woodland types than others.

The importance of a site for future research depends to some extent on how much historical information exists. A wood with a detailed historical record has a greater potential for interpretation than one without, especially if there has been a long period of relatively unchanged management, or if different parts are known to have different histories.

There is also the political consideration that much conservation in Britain is done by amateur bodies and financed by public subscription. The interests of biological conservation often coincide with those of local archaeologists and historians. A project is likely to attract more support if it appeals to a wider range of interests than the specialist concerns of ecologists.

Stage 3: Management

Short-term: coppicing

The silvicultural neglect of many of the older English woodlands in the last few decades, and the decline of coppicing, are a drastic break with previous

practice. Although the effects of coppicing vary widely (Rackham 1967), and Adamson's account for Gamlingay Wood (1912) is only partly representative even of East Anglian woodlands, there is little doubt that neglect results in the loss of many characteristic features and—at least in the first 50 years—a decline in variety of habitats.

Evidence on the length and regularity of the coppice cycle is provided by documents and (for the latter period) by annual rings. In East Anglia, the cycle was generally very short (four or even three years) and irregular (Fig. 2) in the Middle Ages; later it became longer and more regular (e.g. 15–16 years for Hayley Wood in the nineteenth century). Specimens of coppice from ancient buildings suggest that this change may be partly due to a decline in productivity, possibly because of depletion of soil phosphate (Rackham 1967). These long-term changes must be borne in mind when deciding on the length of a restored coppice cycle, an important decision biologically because the length of the closed canopy phase determines to what extent light-demanding herbs and saplings will be suppressed.

Middle-term: standard trees

Many woods have been seriously depleted of mature oaks by excessive felling during or between the World Wars. The following questions arise:

(i) How serious are the consequences, particularly for insects and epiphytes, of a break in the continuity of oaks?

(ii) What steps should be taken to restore the canopy of standards (e.g. by planting oaks or by 'promoting' large coppice)?

(iii) What is a suitable density of standards?

Documents show that the majority of standards in East Anglian woods were normally oak, but other species were sometimes present (e.g. Gamlingay and Hardwick estate papers *passim*). In the Middle Ages, standards were not managed regularly but were felled as demand arose, often in large numbers (e.g. 269 oaks on 40 acres of Gamlingay Wood in 1333). This went on into the seventeenth century at least.* It is probable that most woods have already been through phases when there were few large oaks.

It is often supposed (e.g. Tansley 1939) that the usual density of mature oaks was 12 to the acre (30 per ha), the basis being the statutes of woods (e.g. 1543), which purported to regulate coppice-with-standards management nationally. The assumption overlooks the fact that this density was laid down by statute as a minimum, and that the penalties for infringement were

* In Monks' Park Wood a 'great part of the Timber trees' was felled in 1656–7; in 1669 it was said that as a result the coppice 'is become of a greater value by a third part than it was when the timber was standing'. (Information kindly supplied by Mr A.R. Allan from Court of Exchequer depositions.)

lenient. Nevertheless, this minimum is sometimes written into leases (as late as 1768 at Gamlingay), and it is likely that it had some effect on management. Twelve mature oaks to the acre would normally produce about a 30 per cent canopy, and it is not surprising that this number was often exceeded.* Hayley Wood in the 1920s had an average of about 30 to the acre, whereas Felsham Hall Wood probably had about 9 to the acre.† Similar variations are found in the middle ages. Hardwick Wood had at least 24 oaks to the acre in 1380 (Rackham 1967); Beevor (1924) gives 5 to 40 per acre for various Norfolk woods in the fifteenth century.

Long-term successions

Pollen analysis and documents show that the tree composition of the older East Anglian woods has not changed much in historic times. *Pinus* and *Fagus* apparently became extinct as native trees in the later Middle Ages,‡ probably because in mixed woodland they did not withstand intensive coppicing. *Alnus* is now very rare in boulder-clay woods, probably because the better-drained sites where it is recorded in the Middle Ages have since been cleared. *Tilia* is rarer and more calcifuge than its abundance in pollen diagrams (e.g. Godwin (1968)) leads one to expect, and this may be because it does not compete well with *Fraxinus* and other coppice species.

It is natural to regard oak, as Tansley (1939) does, as the climax dominant of East Anglian woodlands. Although this may have been so in the past, most oak woodland is at present a plagioclimax which can only be maintained in the long run by active management.§ The well-known, though still somewhat obscure, failure of oak to regenerate from seed inside woods will lead in the long run to its replacement by ash. That this has not happened in the past may be due partly to artificial planting, but also to the practice of replacing oak by coppicing; there is considerable evidence from documents and building timbers that oak was formerly widely grown as long-rotation coppice, which would reduce the need for seed regeneration.

But the climax dominant in East Anglia, at least on calcareous soils, is probably not *Fraxinus* but *Ulmus carpinifolia agg.* Many woods show a varying degree of invasion by elm. In the early stages this takes the form of circular patches produced by suckering (Plate 1). Several genotypes are involved. In some cases, the elm coexists with the existing 'heavy' woodland

* The notion that oaks were deliberately grown widely spaced in order to provide natural bends for shipbuilding does not apparently apply to East Anglian woods, which are not known to have supplied timber for shipyards, still less to have been managed to this end.

† Figure deduced from sale particulars kindly supplied by A.R.Allan.

‡ Beech was cut commercially in North Norfolk as late as the thirteenth century (Saunders 1930, p. 77).

§ The Bradfield woods, in which oak regenerates excellently, are an exception.

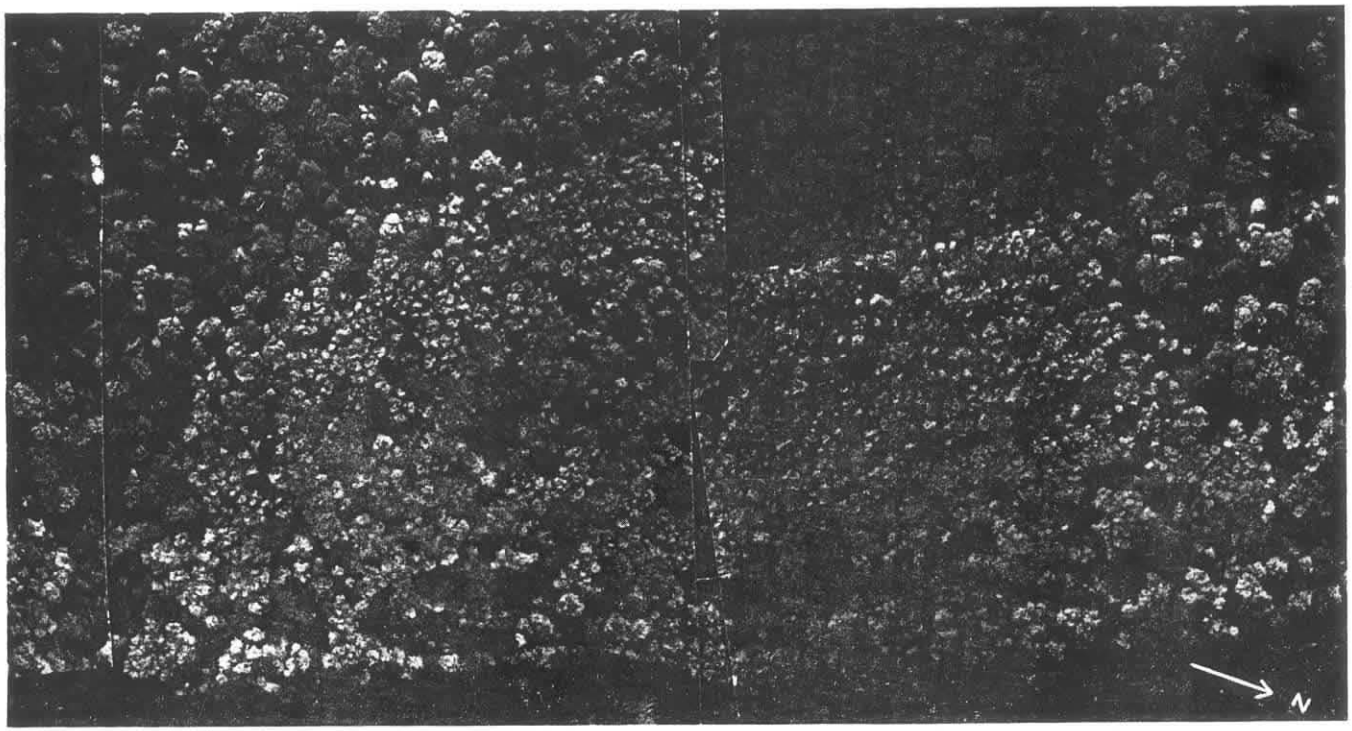

Plate 1. Mosaic aerial photograph of the eastern side of Hayley Wood, Cambs, taken by Cambridge University Department of Aerial Photography in 1963. The large roughly semicircular area is an almost pure stand of *Ulmus carpinifolia* agg. which has largely replaced the *Quercus-Fraxinus-Acer* woodland surviving in the rest of the photograph. There is a zonation in age-structure within the semicircle: the large elms in the interior and near the wood margin are about 200 years old, while the small dense elms near the curved front are much younger and derived from suckers.

trees, at least for a time, but in Hayley Wood and elsewhere it overtops and shades out the oak. In some woods the process is beginning, but others (e.g. Papworth Wood and Overhall Grove) are completely overrun by elm and retain only traces of the former structure. The origin of the process is obscure: it appears to have begun in the eighteenth century or shortly before.* Succession to elm is the natural fate of 'heavy' boulder-clay woodland, although it may be postponed by the isolation of individual woods, and this fact must be considered in long-term management.

An Example—the Bradfield Woods†

Felsham Hall Wood and Monks' Park Wood (Fig. 5) are some 10 km south-east of Bury St Edmund's. Along with Swanton Novers woods (Petch and Swann 1968), they are the most outstanding of the East Anglian woodlands. 'Light' and 'heavy' woodland types occur together; there is an exceptionally rich flora, especially in trees and shrubs; and commercial coppicing still continues. Up to 1968 they were to all practical purposes unknown, earlier work having been forgotten.

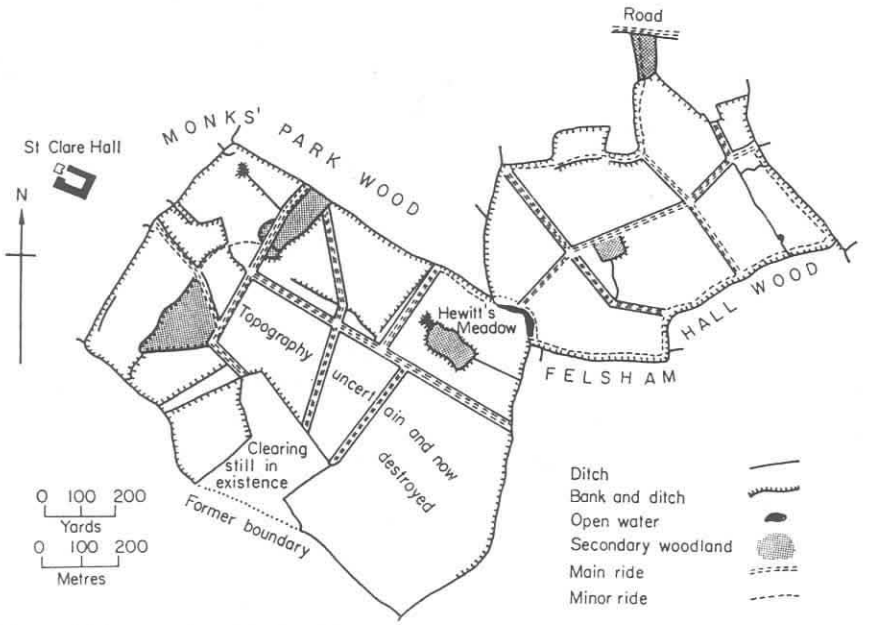

Figure 6. Topography of the Bradfield Woods. Recent changes are ignored.

* It is tempting to attribute the elm invasion to the artificial introduction of new elm genotypes (cf. Richens (1958); but Richens studied *village* elms which are not necessarily genetically related to the nearby woodland elms).

† An outline of work done in collaboration with D.P.Dymond and A.R.Allan, to be published shortly in more detail.

The following is a summary of the historical evidence. A Stage 2 survey was begun at very short notice when the woods were threatened with destruction, and the main outlines emerged within two days (one spent in the field, the other in libraries). Felsham Hall Wood and part of Monks' Park are now owned by the Society for the Promotion of Nature Reserves and further evidence is being sought for management and research.

In the Middle Ages the woods, which appear to have had roughly their present outlines, belonged to Bury St Edmund's Abbey, and are described in its cartularies.* The estate containing Monks' Park Wood was leased at times to the St Clare family and appears in secular records as well. An agreement of 1269 shows that a deer park had been formed in the existing wood and was used for hunting, which strongly suggests that clearings existed in it. Otherwise there is abundant evidence of woodland continuity from 1252 onwards.

Management evidence, both for coppice and standard timber, exists at many points in the same period. Coppicing appears to have followed the usual course, but production has remained high. The early nineteenth-century rotation was regularly 10 years;† but no coppice was cut between 1848 and 1853,† and management has since been less regular. The records of Whelnetham Woodworks Ltd, which coppices the woods, show that the average rotation since 1938 has been about 11 years. The fluctuations in oaks have already been mentioned. The drastic felling of 1669 was repeated in 1929, and there are now only about three mature oaks to the acre (but numerous saplings and stools).

Felsham Hall Wood has a massive wood-bank, which follows most of the irregular northern boundary. Internally it has few surface features apart from the ride ditches and irregular sinuous hollows which may be natural features of the unploughed boulder-clay.

The whole of Monks' Park Wood appears to have been a deer park. It has a broad flattish wood-bank which doubtless carried a high fence. The compact outline and rounded corners suggest economy in fencing. Some of the internal earthworks define four former clearings, which are mentioned in seventeenth century documents and may date from the deer-park period. Hewitt's Meadow, with its pond, is of particular conservation interest because it remained a clearing until about 1900; its partial reopening is being considered. Other internal banks may be copse-banks necessitated by the juxtaposition of coppicing and deer.

Apart from known clearings, the woodland structure and vegetation of the whole area are typical of ancient woodland.

St Clare Hall, a timber-framed house of several medieval and later

* Preserved in Cambridge University Library and consulted at Stage 2.

† *Bury and Norwich Post* sale advertisements, 1853–5.

periods, provides an unusual opportunity for studying datable building timbers of almost certain provenance. Monks' Park was the only wood of any size on the Bradfield St Clare estate. The wood must have provided a much wider range of sizes of oaks in the Middle Ages than it has done recently.

The historical evidence suggests that these woods had a greater diversity of structure and habitat in past centuries than in recent decades. This has probably contributed to their unusual biological interest. A return to such variation, together with continuing the coppicing tradition, would appear to be the most rational principles of future management.

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